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A REVISION OF THE GENUS *MACROSIPHONIELLA* DEL GUERCIO (HEMIPTERA: APHIDIDAE) FROM THE KOREAN PENINSULA, PART I: SUBGENERA *ASTEROBIUM, CHOSONIELLA, PAPILLOMYZUS, PHALANGOMYZUS, SINOSIPHONIELLA*

JAROSLAV HOLMAN, SEUNGHWAN LEE, and JAN HAVELKA

(JH, JH) Institute of Entomology, Academy of Science, Branišovská 31, České Budějovice, Czech Republic (e-mail: holman@entu.cas.cz, jhav@entu.cas.cz); (SL) Division of Entomology, School of Agricultural Biotechnology, Seoul National University, Seoul, 151-742, Korea (e-mail: seung@snu.ac.kr). Corresponding author: Seunghwan Lee

Abstract.—Fifteen species of the subgenera *Asterobium* Hille Ris Lambers 1938, *Chosoniella* Szelegiewicz 1980, *Papillomyzus* Szelegiewicz 1963, *Phalangomyzus* Börner 1939, and *Sinosiphoniella* Tao 1963 of the genus *Macrosiphoniella* del Guercio (Hemiptera: Sternorhyncha: Aphididae), are recorded from the Korean Peninsula. Three new species are described: ***Macrosiphoniella* (*Asterobium*) *ixeridis*, n. sp.** (apterous viviparous females and alate viviparous females) on *Ixeris chinensis* (Thunb.) Nakai and *Youngia sonchifolia* Maxim. (Asteraceae), ***Macrosiphoniella* (*Papillomyzus*) *confusa*, n. sp.** (apterous viviparous females and alate viviparous females) on *Tanacetum boreale* Fisch. ex DC. (Asteraceae), and ***Macrosiphoniella* (*Phalangomyzus*) *pallidipes*, n. sp.** on *Artemisia annua* L. and *A. scoparia* Waldst. & Kit. (Asteraceae). *Macrosiphoniella* (*Phalangomyzus*) *antennata* ssp. *takahashii* Szelegiewicz is a **new synonym** of its nominate taxon. *Macrosiphoniella* (*Sinosiphoniella*) *yomogicola* (Matsumura) is deleted from the list of Korean aphids. In addition, a key to apterous viviparous females of the genus *Macrosiphoniella* in Korean Peninsula is given.

Key Words: Hemiptera, Aphididae, *Macrosiphoniella*, Korea, key to subgenera and species, host plants

The genus *Macrosiphoniella* del Guercio is a relatively large genus with more than 130 Palaearctic and 5 Nearctic species, usually having the siphunculi and cauda of about equal length, siphunculi reticulated on at least apical third (often over distal half), three hairs on the first tarsal segments, and large semilunar antesiphuncular sclerites (not visible in species with reduced pigmentation). A great majority of the species of *Macrosiphoniella* feed on Asteraceae: Anthemideae, mainly on *Artemisia*, and have a stiletto-shaped ultimate rostral segment with the accessory hairs distinctly longer than the three apical pairs. Less than ten species are confined to other genera of the tribe Anthemideae (*Achillea, Tanacetum, Chrysanthemum, Dendranthema*), ten species live on Asteraceae: Astereae (*Aster, Erigeron, Kalimeris*, etc.), for the present one on Asteraceae: Cichorieae, and four to five on each of the tribes Asteraceae: Cynareae (*Centaurea, Cousinia, Jurinea, Picnomon*) and Asteraceae: Inuleae (*Helichrysum, Anaphalis*).

Remaudière and Remaudière. (1997) listed a total of 122 species under seven subgenera: *Macrosiphoniella* del Guercio, *sen-*

su stricto (87), *Asterobium* Hille Ris Lambers (12), *Chosoniella* Szelegiewicz 1980 (2), *Papillomyzus* Szelegiewicz 1963 (4), *Phalangomyzus* Börner 1939 (9), *Ramitrichophorus* Hille Ris Lambers 1947 (4), and *Sinosiphoniella* Tao 1963 (4). Recently, Pashchenko (1998a, 1998b, 1999a, 1999b) reported 36 species from the Russian Far East, including 11 species new to science, and Kadyrbekov (1999) and Kadyrbekov et al. (2002) described two new species of *Macrosiphoniella* from northwestern China.

The subdivision of the genus into seven subgenera as used at present (Szelegiewicz 1980, Remaudière and Remaudière 1997) is rather asymmetrical and probably artificial. These subdivisions are based mainly on a combination of characters which may have evolved independently in different lineages, such as reduced pigmentation and/or dorsal sclerotization, increased numbers of hairs, and relative lengths of the appendages. The separation of the subgenus *Phalangomyzus* from some large species of *Macrosiphoniella* (*s. str.*) is not quite clear, and the subgenera *Asterobium* and *Sinosiphoniella* probably are not monophyletic. The species of the subgenus *Ramitrichophorus* differ from *Macrosiphoniella* (*s. str.*) *helichrysi* Remaudière 1952 and *M.* (*s. str.*) *olgae* Nevsky 1929 which share the same host plant tribe, in the chaetotaxy and the shape of the subanal plate, and the adaptive characters known also in some other ant-attended Macrosiphini. Nevertheless, we have adopted this classification as we do not know of, and at present are not able to propose any alternative which might better reflect the natural relationships.

The first records of Korean *Macrosiphoniella* were given by Okamoto and Takahashi (1927) as *M. formosartemisiae* Takahashi 1921 and *M. astericola* n. sp. (= *M. yomenae* (Shinji 1922)). Since then, Paik (1965, 1972) reported 11 species from South Korea, and Szelegiewicz (1980) recorded 20 species from North Korea, including five new species and two new subspecies.

Materials and Methods

For this study, North Korean specimens were collected by Jan Havelka in 1985, 1987, and 1988. The South Korean specimens include many samples collected by the authors and others available from the collection of the National Institute of Agricultural Sciences and Technology (NIAST), Suwon, Korea. Each sample of aphid colonies was preserved in 80% alcohol before making slides Samples preserved more than one month in alcohol were punctured on the ventral side of the abdomen by a minute insect pin and macerated in 10% potassium hydroxide (KOH) for about 5 minutes depending on the size of aphids. Recent samples were boiled in 95% alcohol for 2–3 minutes before maceration. The macerated specimens were washed 5–6 times in distilled water for at least 5 minutes each time and dehydrated in glacial acetic acid. After being totally dehydrated, each specimen was cleared in clove oil for 10–20 minutes and, finally, mounted in a drop of Canada balsam on a glass slide (see Blackman and Eastop 2000 for details).

Illustrations were taken by a digital camera, Baumer Optronic ARC HR33C, attached on the microscope, Leica DM 400B, at a resolution of 600 dpi. Measurements for each specimen also were taken by the software, Image Lab version 2.2.4.0 by MCM Design (Ltd.), using the digital images. The holotypes of the new species are deposited in the College of Agriculture and Life Sciences, Seoul National University (CALS SNU), Korea. Other specimens are in NIAST, CALS SNU, and and the Institute of Entomology, Czech Academy of Sciences (IE CAS), České Budějovice, Czech Republic. Particular species were compared with Szelegiewicz's specimens (mostly paratypes) from North Korea in the collection in IE CAS and Paik's specimens in the NIAST collection.

Abbreviations used are as follows: al.—alate viviparous female, alata; Ant.—anten-

nae; Ant.I, III, VIb—antennal segment I, III, base of VI, respectively; apt.—apterous viviparous female, aptera; BDAnt.III—basal diameter of antennal segment III; BL—length of body; C—cauda; HFEM—hind femur; HTIB—hind tibia; HT2—second segment of hind tarsus; HW—width of head across the compound eyes ; PT—processus terminalis; SIPH—siphunculi; URS—ultimate rostral sement (segment IV + V). Provincial names of North and South Korea for the collection data: PB-Pyounganbukdo; PN-Pyoungannando; RG-Ryanggangdo; HN-Hwanghaenamdo; GG-Gyeonggido; GW-Gwangwondo; GN-Gyeongsangnamdo; JB-Jeollabukdo. Names of plants with an asterisk (*) indicate new host records for the respective species of aphid.

Five subgenera of the genus *Macrosiphoniella, Asterobium, Chosoniella, Papillomyzus, Phalangomyzus,* and *Sinosiphoniella,* are treated in this paper. The nominate subgenus, *Macrosiphoniella*, will be treated separately in the second part, where also a revised list of host plants of *Macrosiphoniella* spp. in the Korean Peninsula will be given.

Genus *Macrosiphoniella* del Guercio 1911

Macrosiphoniella del Guercio 1911: 331. Type species: *Siphonophora atra* Ferrari 1872, by original designation.

Diagnosis.—Body spindle shaped, comparatively large aphids (mostly 2–5 mm long), mostly shiny dark brown or black in life, some species yellowish green, pink, dark green, often slightly covered with white wax powder. Antennal tubercles well developed; antenna mostly longer than body length, with secondary rhinaria on antennal segment III. Ultimate rostral segment (URS) mostly acute, stiletto or wedge-shaped. First tarsal chaetotaxy 3:3:3. Abdominal dorsum with well-developed scleroites at base of setae or membranous; antesiphuncular sclerites usually well developed, postsiphuncular sclerites absent; siphunculi elongate cylindrical, spinulate at base, and reticulated at least on distal third. Cauda elongate, tongue shaped, or tapering.

Key to Subgenera and Species of the Genus *Macrosiphoniella* of the Korean Peninsula

(For slide-mounted specimens of apterous viviparous females, except the species of the subgenus *Macrosiphoniella*)

1. Anterior abdominal terga each with at least 50 hairs arranged irregularly, not in single transverse rows. Head dorsally with 12 or more hairs in addition to frontal ones (subgenus *Sinosiphoniella*) 2
– Anterior abdominal terga each with at most 40 hairs arranged in transverse rows. Head dorsally with 8 hairs in addition to frontal ones (subgenera *Asterobium, Chosoniella, Macrosiphoniella* (*s.str.*), *Papillomyzus*, and *Phalangomyzus*) 5
2. Cauda tongue-shaped, round at apex. Antenna and tibiae partly pale. Ant.III smooth. Clypeus with 4 hairs only 3
– Cauda tail-shaped, tapering to apex. Antenna and tibiae normally uniformly dark. Ant.III imbricated. Clypeus with 6–8 hairs 4
3. Siphunculus with some setae . . . . . *M.* (*S.*) *chaetosiphon* Takahashi and Moritsu
– Siphunculi without setae . . . . . *M.* (*S.*) *hikosanensis* Moritsu
4. Anterior abdominal terga with dark transverse bars often reduced to small sclerites or scleroties. Cauda with more than 20 setae. SIPH relatively short, at most about as long as cauda . . . . . *M.* (*S.*) *yomogicola* (Matsumura)
– Abdominal dorsum without any sclerotization. Cauda with at most 15 setae. SIPH usually longer than cauda . . . . . *M.* (*S.*) *kuwayamai* (Takahashi)
5. Hind tibia with a dorso-posterior row of short peglike hairs. Head, antennal segments I–II, coxae, trochanters, and basal ½–⅔ of femora pale. Cauda pale or dusky . . . . . *M.* (*C.*) *myohyangsani* Szelegiewicz
– Hind tibia usually without peglike hairs; if present, then head, basal antennal segments, coxae, and trochanters dark 6
6. Abdominal dorsum in apterous viviparous female with nearly hemispheric, pale papillae at base of most hairs. Wings with cubital veins and basal part of radial sector darkly pigmented and faintly bordered . . . . . *M.* (*P.*) *confusa,* n. sp.
– Abdominal dorsum without large, pale papil-

lae at base of hairs. Wings with cubital veins and radial sector not markedly different from other veins 7

7. Cauda usually wide, tongue-shaped, without or with a very slight constriction (Figs. 9–15). Ant.VIb 1.5–2.9 × as long as wedge-shaped URS, usually shorter than HT2, and bearing 7–8 accessory hairs; if 6 only, then primary rhinaria naked and cauda as well as base of siphunculi pale. For most part, very large species with long appendages, deeply concave frons, short URS, and long Ant.I and Ant.VIb (Figs. 6, 9–15) (subgenus *Phalangomyzus*) . . 8
– Cauda more slender, as a rule with distinct constriction (Figs. 1–4). Ant.VIb maximum 1.4 × as long as URS, if longer, then URS bearing 6 accessory hairs and scleroites at base of dorsal abdominal hairs well developed. Medium or small-sized species with relatively short appendages (subgenera *Macrosiphoniella* and *Asterobium*) 14

8. Cauda and siphunculus black 9
– Cauda pale or slightly fuscous, siphunculus pale, at least at extreme base 12

9. Legs black, with extreme bases of femora and sometimes middle parts of tibiae brown . . 10
– Legs mostly pale, with dark brown to black apical ¼–½ of femora, base and apex of tibiae and tarsi. Trochanters and coxae pale, fuscous, or brown, distinctly paler than other pigmented parts of legs 11

10. Body broadly oval, hind tibia maximum 0.70 of body length. Ant.I with 5–8 long hairs. Ant.VIb at most 12 × as long as its middle width and up to 1.6 × as long as HT2. On *Artemisia gmelini* . . . . . *M.* (*Ph.*) *gmelinicola* Szelegiewicz
– Body slender, hind tibia minimum 0.80 of body length. Ant.I with 9–13 long hairs. Ant.VIb about 16–20 × as long as its middle width and about 1.80–2.50 × as long as HT2. On *Artemisia iwayomogi,* rarely on *A. capillaris, A. japonica,* and *A. stolonifera.* . . . . . *M.* (*Ph.*) *antennata* Holman and Szelegiewicz

11. URS longer than HT2. Primary rhinaria naked (Paik's *Macrosiphoniella* sp.B) . . . . . *M.* (*Phalangomyzus*) sp.
– URS shorter than HT2. Primary rhinaria ciliate . . . . . *M.* (*Ph.*) *pallidipes,* n. sp.

12. Primary rhinaria ciliate. URS with 8 accessory hairs . . . . . *M.* (*Ph.*) *oblonga* (Mordvilko)
– Primary rhinaria naked. URS with 6 accessory hairs 13

13. Cauda with 7–15 hairs. SIPH distinctly longer than cauda . . . . . *M.* (*Ph.*) *grandicauda* Takahashi and Moritsu
– Cauda with 26–33 hairs. SIPH as long as or slightly longer than cauda . . . . . *M.* (*Ph.*) *similioblonga* Zhang

14. URS conical, widely obtuse (Figs. 1G, 3H, 4P) (subgenus *Asterobium* (in part)) 15
– URS stiletto-shaped or wedge-shaped, acuminate (Figs. 2G, 6G) (subgenus *Macrosiphoniella* and subgenus *Asterobium* (in part, *M.* (*A.*) *yomenae* (Shinji)) . . See Key in Part 2

15. Yellowish green in life. URS 0.55–0.65 × as long as HT2, with 4 accessory hairs. On *Ixeris chinensis* and *Youngia sonchifolia* . . . . . *M.* (*A.*) *ixeridis,* n. sp.
– Brownish green to brown in life, slightly powdered. URS 0.75–1.00 × as long as HT2, with 6 accessory hairs. On *Aster tripolium* . . . . . *M.* (*A.*) *asteris* (Walker)

Subgenus *Asterobium* Hille Ris Lambers 1938

Macrosiphoniella subg. *Asterobium* Hille Ris Lambers 1938. Type species: *Aphis asteris* Walker 1849, by original designation.

Macrosiphoniella (*Asterobium*) *asteris* (Walker 1849) (Fig. 1)

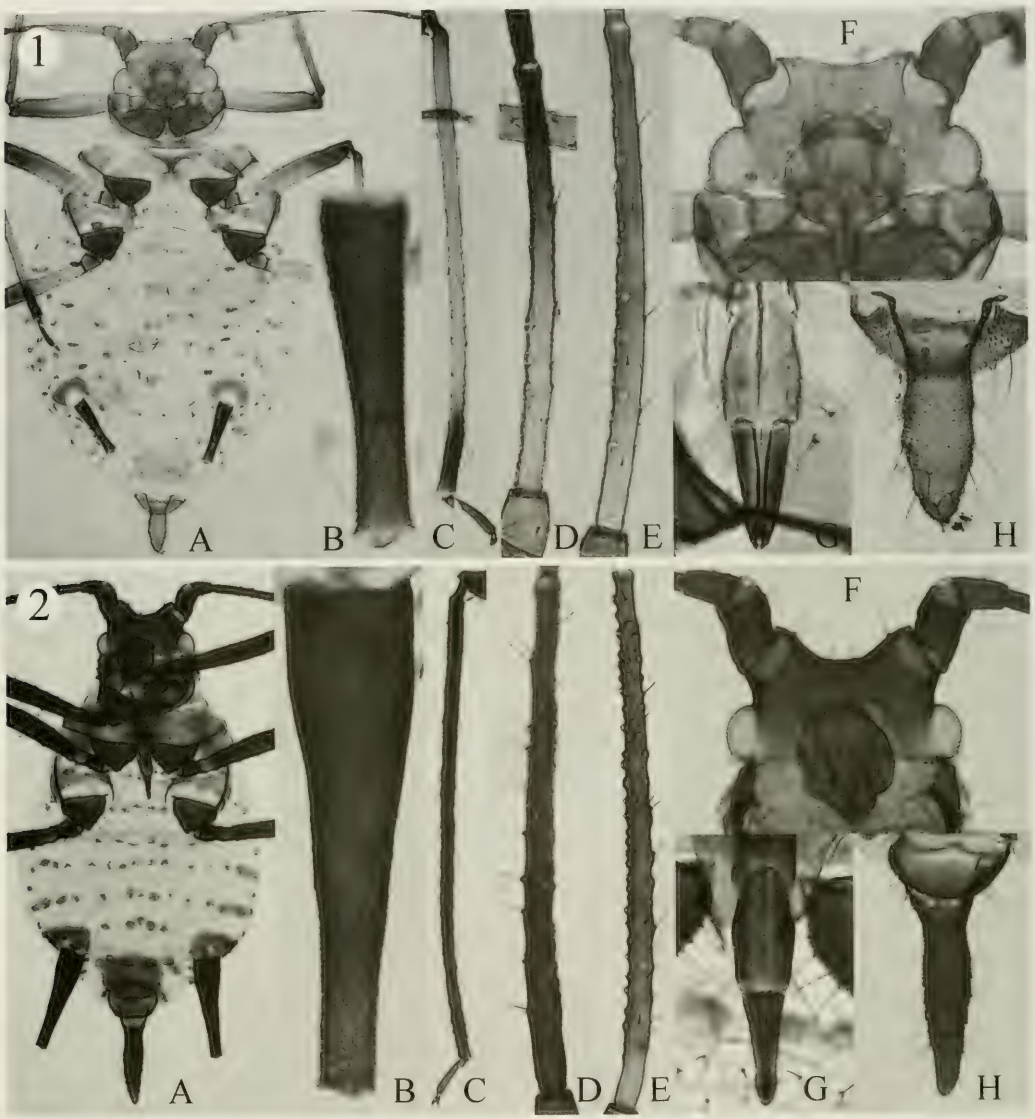
Aphis asteris Walker 1849: 48.
Macrosiphoniella sp. A: Paik 1972: 403.
Macrosiphoniella (*Asterobium*) *asteris*: Eastop 1976: 249; Remaudière and Remaudière 1997: 111.

Specimens examined.—SOUTH KOREA: Numerous specimens including the apterous viviparous females, alate viviparous females, and alate males on *Aster tripolium* L. (Asteraceae) during May to October in 1999–2002, only from Daebu-do, GG, the western coast of central Korea. Deposited in NIAST, CALS SNU, IE CAS.

Distribution.—Europe (Denmark, Sweden, Norway, Finland, Belgium, Germany, Poland, France, Austria, Hungary, Italy), central Asia, eastern Asia (Korea, new record).

Host plant and biology.—Holocyclic, monoecious on *Aster tripolium* L. (Asteraceae). Feeds on the young shoots or between the inflorescences, often forming dense colonies.

Notes.—Specimens from Korea do not



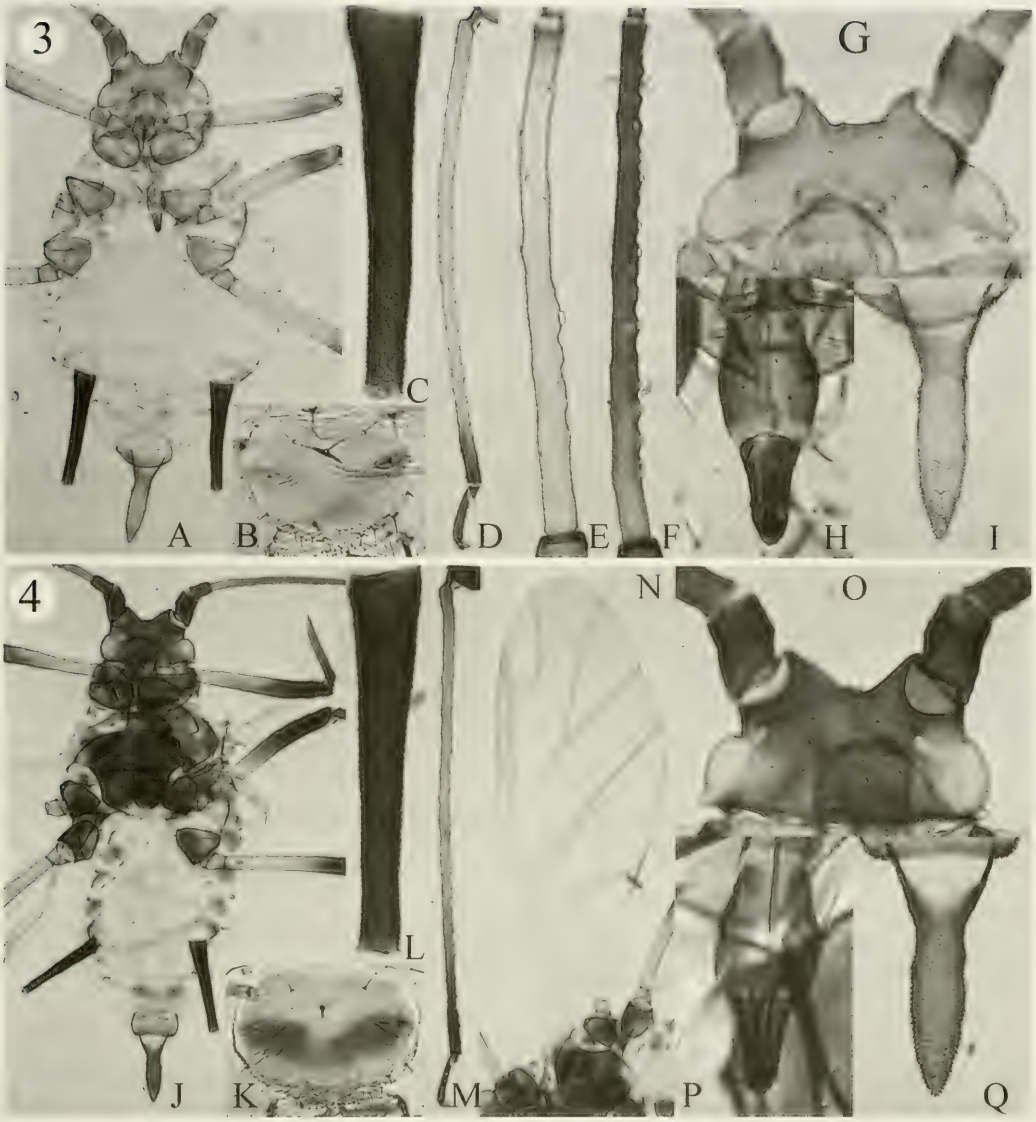
Figs. 1–2. Apterous viviparous female (unless otherwise indicated). 1 (top), *Macrosiphoniella* (*Asterobium*) *asteris*. 2 (bottom), *M.* (*A.*) *yomenae*. A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Antennal segment III of alate viviparous female. F, Head and antennal segment I–II. G, Ultimate rostral segment. H, Cauda.

differ substantially from the European ones. This species was recorded by Paik (1972) as *Macrosiphoniella* sp.A.

Macrosiphoniella (*Asterobium*) *ixeridis* Holman, Lee, and Havelka, new species

(Figs. 3–4, Table 1)

Apterous viviparous female.—*Color:* In life pale green or yellowish green with dark head and tips of appendages. In cleared specimens, head including rostrum brown, darker toward antennal tubercles; Ant.I and Ant.II concolorous with head, Ant.III and basal half of Ant.IV pale, articulation Ant.III/IV, distal part of Ant.IV, and entire Ant.V and Ant.VI brown to dark brown. Legs dark to blackish brown on coxae, distal third of femora, tips of tibiae and entire



Figs. 3–4. *Macrosiphoniella* (*Asterobium*) *ixeridis*. 3 (top), Apterous viviparous female. 4 (bottom), Alate viviparous female. A, Entire body. B, genital plate. C, Siphunculus. D, Hind tibia and tarsus. E, Antennal segment II and III. G, Head and antennal segment I–II. H, Ultimate rostral segment. I, Cauda. F, Antennal segment III of alate viviparous female. J, Whole body. K, Genital plate. L, Siphunculus. M, Hind tibia and tarsus. N, Forewing. O, Head and antennal segment I–II. P, Ultimate rostral segment. Q, Cauda.

tarsi; remainder pale, trochanters sometimes slightly dusky. Abdominal dorsum pale with dusky antesiphuncular sclerites and scleroites at base of dorsal hairs. Siphunculus blackish brown, cauda dusky.

Morphological characters: Body spindle–shaped, about 2–3 mm long. Head deeply sinuate with high antennal tubercles bearing 3 hairs on inner side. Occipital and frontal hairs slightly capitate, 0.03–0.04 mm long. Antenna about as long as body, PT 3.50–4.00 × as long as Ant.VIb. Antennal hairs capitate, maximum ¾ of BDAnt.III. Primary rhinaria ciliate. Secondary rhinaria 5–7 on basal third of Ant.III. Rostrum attaining mesothoracic

Table 1. Measurements (ranges) of apterous viviparous females of *Macrosiphoniella (Asterobium) crepidis, M. (Asterobium) ixeridis*, and *M. (Papillomyzus) confusa.*

Taxon No. of Specimens/Samples	*M. (Asterobium) crepidis* 21/4	*M. (Asterobium) ixeridis* 5/2	*M. (Papillomyzus) confusa* 5/1
Lengths (in mm)			
BL	1.77–2.50	2.33–2.89	2.30–2.90
Ant.	1.90–2.57	2.37–2.85	3.07–3.48
SIPH	0.35–0.52	0.50–0.56	0.46–0.53
C	0.36–0.48	0.43–0.48	0.35–0.45
URS	0.11–0.13	0.10–0.11	0.13–0.15
HT2	0.17–0.20	0.19–0.20	0.14–0.16
HW	0.47–0.60	0.53–0.56	0.54–0.56
Ant.I	0.13–0.15	0.14–0.17	0.16–0.19
Ant.VIb	0.16–0.19	0.16–0.20	0.19–0.25
Ratios			
Ant./BL	1.13–1.24	0.92–1.06	1.18–1.33
SIPH/BL	0.16–0.23	0.19–0.22	0.18–0.20
SIPH/C	0.94–1.18	1.16–1.24	1.12–1.31
URS/HT2	0.61–0.70	0.55–0.63	0.88–1.10
URS/Ant.I	0.78–0.98	0.67–0.71	0.72–0.85
URS/Ant.VIb	0.62–0.76	0.55–0.67	0.54–0.68
URS/HW	0.23–0.26	0.18–0.20	0.24–0.28
SIPH/HW	0.72–1.00	0.94–1.03	0.92–1.00
SIPH/HFEM	0.44–0.59	0.56–0.65	0.54–0.57
SIPH/URS	2.84–4.40	5.02–5.24	3.94–5.36
HT2/HW	0.37–0.40	0.32–0.35	0.27–0.31
HT2/Ant.VIb	0.92–1.12	0.97–1.18	0.61–0.72
Ant.VIb/Ant.I	1.17–1.45	1.05–1.20	1.18–1.35
Ant.VIb/HW	0.33–0.41	0.30–0.36	0.40–0.46
Ant.I/HW	0.26–0.30	0.26–0.31	0.31–0.34
PT/Ant.VIb	2.40–3.30	3.50–3.95	3.48–4.00
No of hairs on			
Cauda	27–41	10–12	10–12
URS (accessory)	5–6	5–6	5–6

coxae. URS 0.010–0.011 mm long, conical with blunt apex, bearing 4 accessory hairs approximately equal in length to longest apical hairs. Legs moderately long, hind tibia 0.55–0.65 × of body, hind femur about twice as long as HW. Hairs on legs blunt or slightly capitate; dorsal (outer) hairs on hind tibia maximum 0.7 of diameter of tibia near midpoint. Hind tarsus with 2 dorsolateral and 5 ventral hairs in addition to 6 apical hairs. Abdominal dorsum membranous with large antesiphuncular sclerites and small scleroites at base of hairs. Dorsal abdominal hairs capitate, on anterior segments maximum 0.04 mm long, 12–18 on tergum 3, 3–4 on tergum 6 between siphunculi and 5–8 on tergum 8. Siphunculus cylindrical, tapering, longer than cauda, about equal in length to HW, with minimum diameter slightly exceeding diameter of hind tibia at midpoint. Reticulation developed on apical third of siphunculus, flange small but distinct. Cauda constricted at basal third, acuminate, with 9–12 hairs. Genital plate with two long hairs on disc, usually two shorter ones on sides and 10–12 along hind margin. For measurements and comparison with *M.* (*A.*) *crepidis,* see Table 1.

Alate viviparous female.—*Color:* Mostly similar to apterous female. Thorax dark. Antenna entirely dark with pale or dusky base of Ant.III; tibiae with middle portions

dusky. *Morphological characters:* Abdominal dorsum with large, dusky marginal sclerites on terga 2–4. Secondary rhinaria with 15–21 on entire length of Ant.III. Wing venation normal, one paratype with an abnormally single-forked median vein whereas others normal with two-forked median veins (Fig. 4N); veins pale, slightly bordered with dusky pigmentation. Other characters as in apterous viviparous female.

Type material.—Holotype: Apterous viviparous female (apt.), Coll.# 88Ha2789/ apt.1, Botanical Garden, Taesong-san, Pyongyang-si Distr., NORTH KOREA, 3.vi.1988, leg. Jan Havelka, on *Ixeris chinensis* (Thunb.) Nakai. Paratypes: 3 apterous viviparous females from the same sample as holotype; 1 apt. and 3 alate viviparous females, Coll#85Ha406, Chongryongsan, Pyongsong-si, PN, NORTH KOREA, 7.vi.1985, leg. Jan Havelka, on *Youngia sonchifolia* Maxim. Holotype deposited in CALS SNU and paratypes in NIAST, CALS SNU, and IE CAS.

Host plants and biology.—*Ixeris chinensis* (Thunb.) Nakai and *Youngia sonchifolia* Maxim. (Asteraceae: Cichorieae). Living on terminal parts of the host plants. Presumably holocyclic and monoecious.

Etymology.—The species name is derived from the genus name of one of the host plants.

Systematic position.—*Macrosiphoniella* (*A.*) *ixeridis* resembles *M.* (*A.*) *crepidis* Holman and Szelegiewicz, 1974, in general morphology and host plants (*Crepis, Ixeris,* and *Youngia* belong to Asteraceae: Cichorieae unlike the host plants of other *Macrosiphoniella* spp.). *Macrosiphoniella* (*A.*) *ixeridis* differs from the latter species (data in parenthesis) in having tibiae pale except for the apical part (entirely dark), PT 3.50–4.00 × as long as Ant.Vib (2.40–3.30 ×), 9–12 caudal hairs (14–25) and slightly shorter URS which is 0.10–0.11 mm long in the types (0.12–0.13 mm). Because of this, the ratios URS/Ant.I and URS/HW are also different (see Table 1).

Macrosiphoniella (*Asterobium*) *yomenae* (Shinji 1922)
(Fig. 2)

Macrosiphum yomenae Shinji 1922: 788.
Macrosiphum yomenafoliae Shinji 1922: 788.
Macrosiphum moriokae Shinji 1924: 362.
Macrosiphoniella astericola Okamoto and Takahashi 1927: 132.
Macrosiphoniella yomenae: Eastop 1976: 254.
Macrosiphoniella (Asterobium) yomenae: Remaudière and Remaudière 1997: 112.

Specimens examined.—19 samples containing apterous and alate viviparous females collected throughout the Korean Peninsula from the southernmost point of Jeju Island to the northernmost Paektu-san Mountain regions, on *Aster koraiensis, Erigeron annuus,* and *Artemisia* spp. (*annua, gmelini, rubripes*). Specimens are deposited in NIAST, CALS SNU, and IE CAS.

Distribution.—Korea (North, South), Russia (Maritime Territory), China (Szechuan), Taiwan, Japan (Hokkaido, Honshu, Kyushu).

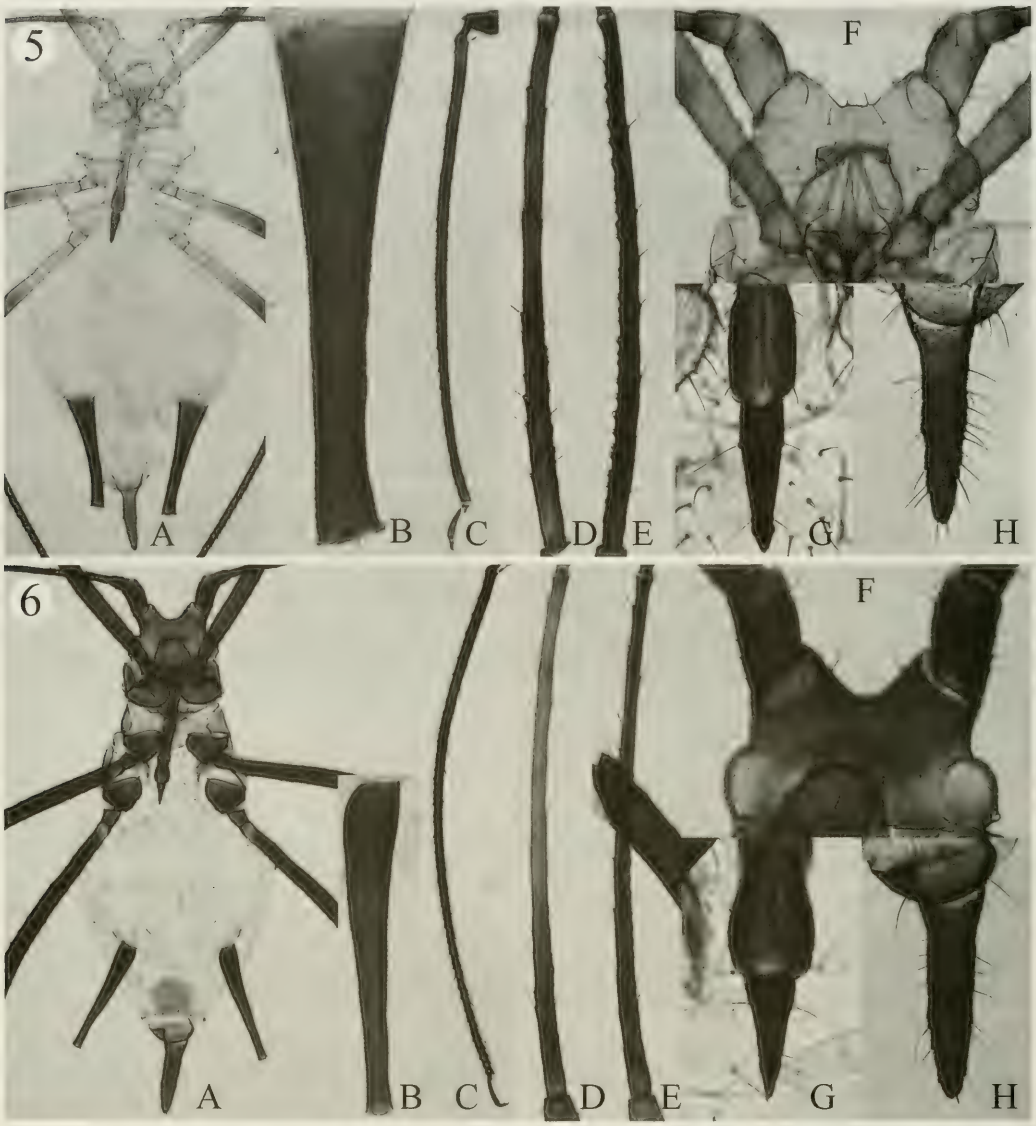
Host plants.—*Artemisia* (*annua* L., *gmelini* Webb. ex Stechm., *rubripes* Nakai), *Aster* (*ageratoides* Turcz., **koraiensis* Nakai, *hayatae* H. Lev. and Vaniot, *yomena* (Kitam.) Honda), *Boltonia lautureana* Debeaux, **Erigeron annuus* (L.) Pers., *Kalimeris incisa* var. *australis* (M.Kitagawa) M.Kitagawa.

Subgenus *Chosoniella* Szelegiewicz 1980

Macrosiphoniella subg. *Chosoniella* Szelegiewicz 1980: 424. Type species: *Macrosiphoniella* (*Chosoniella*) *myohangsani* Szelengiewicz 1980 by original designation.

Macrosiphoniella (*Chosoniella*) *myohyangsani* Szelegiewicz 1980
(Fig. 5)

Macrosiphoniella (*Chosoniella*) *myohangsani* Szelegiewicz 1980: 424



Figs. 5–6. Apterous viviparous female (unless otherwise indicated). 5 (top), *Macrosiphoniella* (*Chosoniella*) *myohyangsani*. 6 (bottom), *M.* (*Phalangomyzus*) *antennata*. A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Antennal segment III of alate viviparous female. F, Head and antennal segment I–II. G, Ultimate rostral segment. H, Cauda.

Specimens examined.—NORTH KOREA: Myohyang-san, PB, 25.vi.87, on *Artemisia japonica, A. mongolica, A. stolonifera* (87Ha1981, 87Ha1982, 87Ha2019, 87Ha2031: apt. & al.); Sangwon-am, Hyang-san, HN, 23.ix.1966, leg. H. Szelegiewicz, on *A. sylvatica* (Szel.3499: 2 apt., paratypes).

Distribution.—Korea (North), Russia (Far East).

Host plants.—*Artemisia* (**japonica* Thunb., **mongolica* Fisch. ex Bess., *stolonifera* (Maxim.) V.L.Komarov, *sylvatica* Schlecht. ex Ledeb.).

Notes.—Szelegiewicz (1980) pointed out the close resemblance of *M.* (*Ch.*) *myoh-*

yangsani to *M.* (*Ch.*) *spinipes* A. N. Basu 1968. On the basis of descriptions of the latter species, he concluded that they were different in that *M.* (*Ch.*) *spinipes* has no marginal tubercles, shorter dorsal hairs, and longer siphunculi with much longer reticulated zones and much longer cauda. We examined paratypes of *M.* (*Ch.*) *spinipes* (one apterous and one alate viviparous female from Kalimpong, India, 7.iv.1963, on *Artemisia vulgaris,* leg. A.N. Basu, in coll. of The Natural History Museum, London), and found that in *M. spinipes*: 1) marginal tubercles on abdominal segments 2–4 are well developed (up to 0.02 mm in diameter); 2) dorsal hairs on tergum 3 are 0.08 (spinals) to 0.11 mm (marginals) are long and thus not different from those in *M.* (*Ch.*) *myohyangsani*; and 3) the relative length of the siphunculi and extent of the siphuncular reticulated zone in the two species are not substantially different. Szelegiewicz (1980) mentioned and illustrated the presence of a narrow flange in *M.* (*Ch.*) *myohyangsani.* In most additional Korean specimens we have collected, the flange is not developed as it is in the paratypes of *M.* (*Ch.*) *spinipes* we have examined. Apart from the presence of a dorsoposterior row of numerous peglike hairs along the entire length of the hind tibiae, the two species share other remarkable characters that are not common among *Macrosiphoniella*-like aphids: pale head and antennal segments I–II; pale coxae and trochanters; URS slightly constricted toward the base, with 8 accessory hairs of which the longest is the lateral pair situated near the midpoint; and siphuncular reticulation consisting of relatively small cells, 8 or more in a transverse row such as those in many *Uroleucon* spp. There is no doubt that *Chosoniella* is a well-characterized taxon at least of subgeneric range. Nevertheless, additional study is needed to prove that *M.* (*Ch.*) *spinipes* and *M.* (*Ch.*) *myohyangsani* are separate taxa.

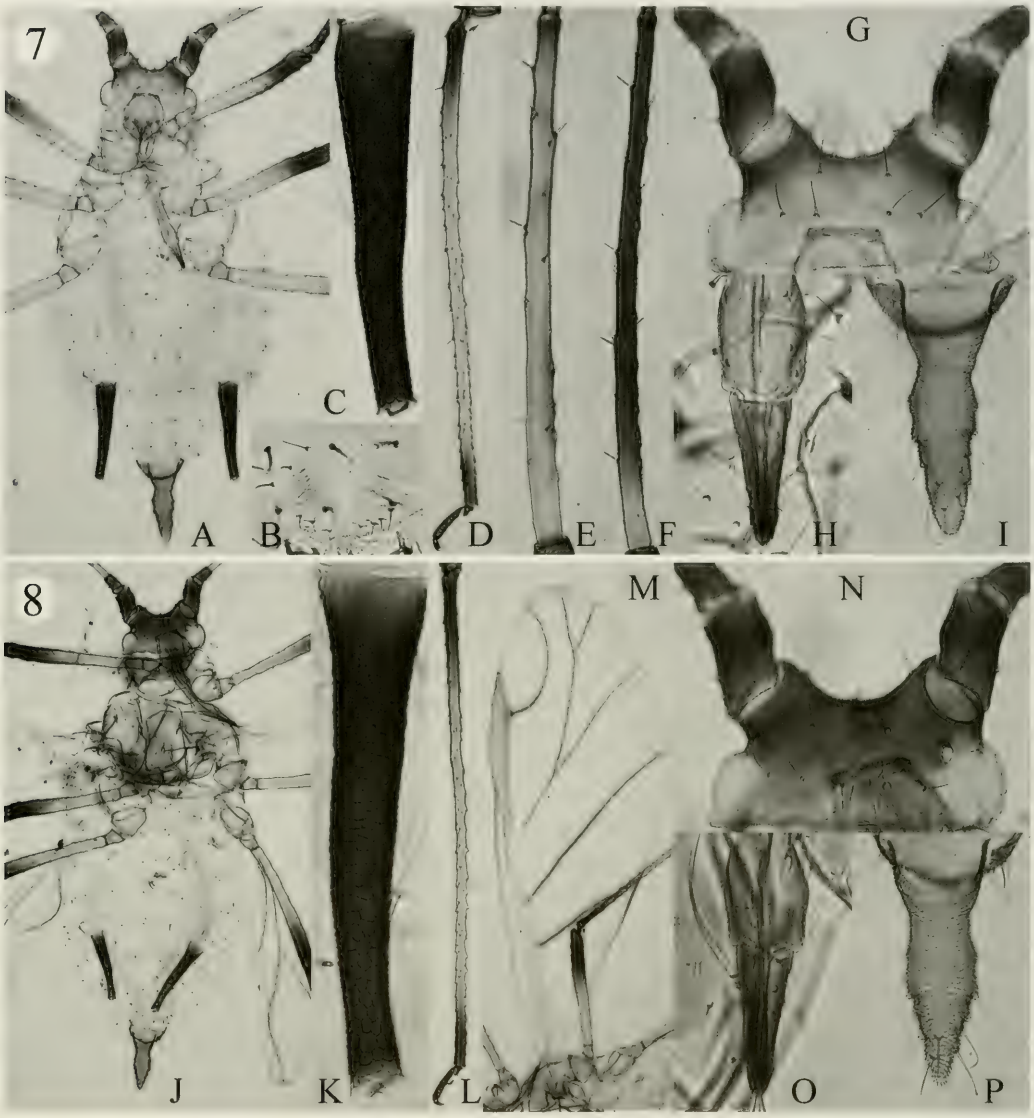
Subgenus *Papillomyzus*
Szelegiewicz 1963

Macrosiphoniella subg. *Papillomyzus* Szelegiewicz 1963: 56. Type species: *Macrosiphoniella* (*Papillomyzus*) *riedeli* Szelegiewicz 1963, by original designation.

Macrosiphoniella (*Papillomyzus*) *confusa* Holman, Lee, and Havelka, new species
(Figs. 7–8)

Apterous viviparous female.—*Color:* In life unknown. In cleared specimens, head in front dark to blackish brown, gradually paler towards occiput; thorax and abdomen pale, without any pigmentation; antenna with basal segments concolorous with frons, Ant.III-IV pale on basal half, remainder of flagellum brown; legs including coxae pale with dark knees, apices of tibiae, and tarsi; cauda pale to slightly smoky; siphunculus blackish brown.

Morphological characters: Body about 2–3 mm long. Frons widely and rather deeply concave, antennal tubercles high, with 3 hairs on inner side. Dorsal cephalic hairs stout, with slightly widened apex, 0.06–0.08 mm long, 1.80–2.20 × BDAnt.III. Clypeus with 4 and mandibular laminae with 2–3 hairs. Rostrum reaching to hind coxae, URS wedge-shaped and blunt with 6 accessory hairs, 0.88–1.10 × HT2. Antenna about 1.15–1.35 × as long as body. Ant.I relatively long, with 1 long hair on outer side and 4 hairs on distal half. Antennal hairs blunt to slightly flattened at apex, about equal to BDAnt.III. Secondary rhinaria relatively small (0.01–0.02 mm in diameter), protruding with narrow rims, 4–6 in one row on basal 0.30–0.40 of Ant.III. Primary rhinaria ciliate. Legs moderately long, HTIB/HW = 3.00–3.25; ventral hair on hind trochanter about equal to, or slightly longer than diameter of trochantral-femoral suture; dorsal hairs on hind tibia capitate, longest ones slightly longer than diameter of tibia at midpoint; HT2 with 2 dorsal and 3 ventral hairs in addition to 6 apical ones. Abdominal dorsum membra-



Figs. 7–8. *Macrosiphoniella* (*Papillomyzus*) *confusa*. 7 (top), Apterous viviparous female. 8 (bottom), Alate viviparous female. A, Entire body. B, Genital plate. C, Siphunculus. D, Hind tibia and tarsus. E, Antennal segment II and III. F, Antennal segment III of alate viviparous female. G, Head and antennal segment I-II. H, Ultimate rostral segment. I, Cauda. J, Whole body. K, Siphunculus. L, Hind tibia and tarsus. M, Forewing. N, Head and antennal segment I–II. O, Ultimate rostral segment. P, Cauda.

nous with sclerotized (but not pigmented), nearly hemispheric papillae at bases of most dorsal hairs which are stout, capitate, 0.07–0.09 mm long, 10–13 on tergum 3, 4 on tergum 6 between siphunculi and 4–5 on tergum 8; ventral abdominal hairs finely pointed, distinctly shorter than dorsal ones. Marginal tubercles not developed. Siphunculus 0.18–0.20 × as long as body length, relatively thick at base, tapering, with smallest diameter just below flange distinctly exceeding diameter of hind tibia at midpoint. Basal half of siphunculus nearly smooth, reticulated on apical $^2/_7$–$^2/_5$. Cauda elongate triangular, acuminate and only slightly constricted at basal third, with 10–

12 hairs. Genital plate with 2 long hairs on anterior half, 0–2 shorter hairs on each side, and 6–8 hairs along hind margin.

Alate viviparous female.—*Color:* Similar to apterae; head, thorax, and antenna (Ant.III and Ant.IV) dark. Wings with cubital veins (Cu1 and Cu2) and base of radial sector (RS) black, bordered with diffuse, dusky pigmentation.

Morphological characters: Body 2.30–3.20 mm long. Antenna 1.20–1.40 × as long as body. Secondary rhinaria 9–17 on two-thirds to entire length of Ant.III. Abdominal terga 3 and 8 with 12–17 and 4–6 hairs, respectively; dorsal papillae low or indistinct. Siphunculus more slender than in apterae, 0.14–0.19 of body length, with spinulose imbrications on basal half. Other characters same as those in apterous viviparous female.

Type material.—Holotype: apterous viviparous female (Coll# 85HA1216/apt.3), Mupo (Paektu Mt. Reg.), NORTH KOREA, RG, 14.vii.1985, on *Tanacetum boreale* Fisch. ex DC., leg. Jan Havelka. Paratypes: 4 apterous and 7 alate viviparous females from the same collection as holotype. Holotype deposited in CALS SNU and paratypes in NIAST, CALS SNU, and IE CAS.

Host plant.—*Tanacetum boreale* Fisch. ex DC.

Distribution.—Korea (North, Paektu-san regions).

Systematic position.—*Macrosiphoniella* (*Papillomyzus*) *confusa* resembles *M.* (*P.*) *arctica* Pashchenko 1999a. It differs from the latter in having: 1) longer antennae with longer Ant.VIb (1.50–1.85 × URS versus 1.20–1.30); and 2) longer siphunculi (SIPH/C = 1.12–1.31 versus 0.80–0.90). In view of the limited number of specimens, other differences following from the comparison of the types of *M.* (*P.*) *confusa* and the original description of *M.* (*P.*) *arctica* (data in parenthesis), may not be reliable: SIPH/BL = 0.18–0.20 (0.14–0.18); URS/HT2 = 0.90–1.10 (0.80); and no. of caudal hairs = 10–12 (12–18). The remarkable dimorphism in the length of dorsal abdominal hairs (approx. 0.10 and 0.03 mm) described in *M.* (*P.*) *arctica* was not found in *M.* (*P.*) *confusa.* The siphunculi in the apterous viviparous female of the new species are relatively robust and tapering, with a distinct flange whereas those in *M.* (*P.*) *arctica* are described as relatively thin and without a flange. Three species of the genus *Macrosiphoniella* so far have been recorded on *Tanacetum boreale* in the Far East. *Macrosiphoniella* (*s. str.*) *sanborni* (Gill.) is reddish brown in life with pale middle portions of the tibiae, URS longer than HT2, 16–22 caudal hairs, and naked primary rhinaria. In *Macrosiphoniella* (*s. str.*) *tanacetaria* ssp. *divia* Pashchenko 1998b, the legs are dark except for a narrow zone at the base of femora and the tibiae are somewhat paler in the middle but never concolorous with the body in cleared specimens. *Macrosiphoniella abrotani chosoni* Szelegiewicz has pale cauda and basal part of the siphunculi. The record of *M. tanacetaria* on *Tanacetum boreale* in the Russian Far East (Pashchenko 1998b) might refer to *M. pseudotanacetaria.* By the papillae at the base of dorsal abdominal hairs, robust siphunculi, and elongate cauda in the apterous viviparous female and also by pigmentation of some wing veins in the alatae, the new species resembles the western Palaearctic species of the subgenus *Papillomyzus.* The latter live on Asteraceae: Cynareae (*Centaurea jurinea, Carduus, Cnicus*) whereas the two far eastern species are confined to Asteraceae: Anthemideae.

Subgenus *Phalangomyzus* Börner 1939

Macrosiphoniella subg. *Phalangomyzus* Börner 1939. Type species: *Siphonophora oblonga* Mordvilko 1901, by original designation.

Macrosiphoniella
(*Phalangomyzus*) *antennata*
Holman and Szelegiewicz 1978
(Fig. 6, Table 2)

Macrosiphoniella (*Phalangomyzus*) *antennata* Holman and Szelegiewicz 1978: 189.

Table 2. Measurements (ranges) of apterous viviparous females of Korean *Macrosiphoniella (Phalangomyzus) antennata, M. (Ph.) pallidipes*, and alate viviparous females of *M. (Phalangomyzus)* sp. (= Paik's *Macrosiphoniella* sp. B).

Taxon No. of Specimens/Samples	*M. (Ph.) antennata* 37/13	*M. (Ph.) pallidipes* 8/4	*M. (Ph.)* sp. 3/3
Lengths (in mm)			
BL	3.03–4.37	3.07–3.44	3.14–3.33
Ant.	4.71–5.62	3.64–4.29	4.77–5.22
SIPH	0.64–0.81	0.45–0.56	0.71–0.77
C	0.50–0.66	0.44–0.53	0.43–0.48
URS	0.13–0.16	0.13–0.15	0.20–0.21
HT2	0.16–0.20	0.16–0.18	0.16–0.17
HW	0.52–0.64	0.51–0.58	0.53–0.59
Ant.I	0.22–0.25	0.19–0.22	0.22–0.25
Ant.VIb	0.31–0.49	0.29–0.34	0.33–0.37
Ratios			
Ant./BL	1.28–1.65	1.14–1.25	1.52–1.57
SIPH/BL	0.17–0.25	0.15–0.17	0.22–0.24
SIPH/C	1.03–1.37	1.00–1.12	1.54–1.67
URS/HT2	0.77–0.86	0.77–0.86	1.20–1.30
URS/Ant.1	0.61–0.70	0.62–0.74	0.81–0.93
URS/HW	0.25–0.28	0.24–0.27	0.33–0.39
SIPH/HW	1.03–1.40	0.88–0.97	1.27–1.44
SIPH/HFEM	0.35–0.48	0.38–0.42	0.50–0.53
HT2/HW	0.30–0.35	0.30–0.34	0.28–0.30
HT2/Ant.VIb	0.40–0.60	0.50–0.61	0.46–0.50
Ant.VIb/Ant.I	1.38–2.03	1.37–1.64	1.37–1.64
Ant.VIb/HW	0.55–0.79	0.51–0.63	0.57–0.69
Ant.I/HW	0.38–0.44	0.36–0.41	0.41–0.47
PT/Ant.VIb	2.25–3.05	2.56–3.16	3.28–3.22
HFEM/HW	2.70–3.09	2.16–2.41	2.48–2.52

Macrosiphoniella (*Phalangomyzus*) *antennata* ssp. *takahashii* Szelegiewicz 1980. **New synonymy.**

Specimens examined.—NORTH KOREA: Hyesan, Paektu-san Reg., RG, 10.vii.1985, on *Artemisia japonica* (85Ha1523: apt.); Samilpo, Kumgan-san Reg., GW, 6.vi.1987, on *A. stolonifera* (87Ha1671: apt. & al.); Taesong-san, Pyongyang Dist., 2–4.vi.1988, on *A. iwayomogi* (88Ha2758B, 88Ha2764, 88Ha2766, 88Ha2776b, 88Ha2819, 88Ha2825: apt. & al.). SOUTH KOREA: Medicinal Herbs Experimental Station, Jinan, JB, 13.v.1999, on *A. iwayomogi* (990512–52SH: apt.& al.); Kuidun-ri, Inje-gun, GW, 4.vi.1999, *A. iwayomogi* (990602–70SH & 99Ho676: apt.); Medicinal Herbs Experimental Station, Hamyang, GN, 20.vi.2000, on *A. iwayomogi* (000620-SH39: apt. & ny.); Medicinal Herbs Experimental Station, Jinan, JB, 20.vi.2000, on *A. iwayomogi* (000620-SH16: apt. & al.); Mountain Vegetable Experimental Station, Pyongchang-gun, GW, 31.v.2001, *A. iwayomogi* (01Ho173A, 01Ho174D: apt.); Yeonhwa-gyekok, Yongweol-gun, GW, 2.vi.2001, *A. iwayomogi* (01Ho240B, 01Ho241B: apt.). Deposited in NIAST, CALS SNU, and IE CAS.

Distribution.—Korea (North, South), Mongolia, Russia (Far East).

Host plants.—*Artemisia* spp. (*gmelini, iwayomogi* Kitam., **japonica, vulgaris* L. (= *tanacetifolia* L.).

Biology.—Preference is for *A. iwayomogi* on which it lives solitarily or in small

groups, mostly less than 10 specimens, at the top of shoots and on the underside of leaves. The adults drop quickly to the ground when disturbed.

Note.—Szelegiewicz (1980) found that the two samples of *M.* (*Ph.*) *antennata* collected in N. Korea differ from the Mongolian types and described them as subsp. *takahashii.* The latter were characterized as pinkish pruinose (not bluish pruinose) in life, with indistinct antesiphuncular sclerites, longer siphunculi (0.19–0.23 of the body length and 1.1–1.4 × cauda compared with 0.13–0.19 and 0.9–1.2 × in the nominate subspecies, respectively), and shorter dorsal and longer tibial hairs. The specimens collected in N. Korea by J. Havelka resemble the Mongolian types by color in life and chaetotaxy, but in other respects being closer to the subsp. *takahashii* or intermediary. The South Korean specimens collected by the authors resemble the subsp. *takahashii* by color in life, and long siphunculi and broken antesiphuncular sclerites, whereas in the chaetotaxy they coincide with subsp. *antennata* (*s. str.*). We believe that the differences between the studied samples and the types of *M.* (*Ph.*) *antennata* do not justify the separation of the eastern Asian population as a subspecies.

Macrosiphoniella (*Phalangomyzus*) *gmelinicola* Szelegiewicz 1980
(Fig. 9)

Macrosiphoniella (*Phalangomyzus*) *gmelinicola* Szelegiewicz 1980.

Specimens examined.—NORTH KOREA: Myohang-san (Rohyon-ri), PN, 13.v.1988, on *Artemisia iwayomogi* (88Ha2413: apt.); Hyesan, RG, 26.vi.1988, on *Artemisia gmelini* (88Ha3186: al.).

Distribution.—Korea (North), Russia (Far East).

Host plants.—*Artemisia sacrorum* Ledeb., **A. iwayomogi* Kitam.

Macrosiphoniella (*Phalangomyzus*) *grandicauda* Takahashi and Moritsu 1963
(Fig. 10)

Macrosiphoniella grandicauda Takahashi and Moritsu 1963: 9.

Dactynotus macrocaudus Tao 1964: 231. (syn. by Miyazaki 1971)

Macrosiphoniella (*Phalangomyzus*) *grandicauda*: Remaudière and Remaudière 1997: 112.

Specimens examined.—22 samples containing apterous and alate viviparous females collected throughout the Korean Peninsula from the southernmost Jeju-do to Wonsan, on *Artemisia* spp. (*argyi, feddei, iwayomogi, japonica, mongolica, montana, princeps orientalis, rubripes, stolonifera, vulgaris*). Deposited in NIAST, SNU, and IE CAS.

Distribution.—Korea (North, South); Japan (Hokkaido, Honshu, Amami-oshima, Ryukyu); India.

Host plants.—*Artemisia* spp. (**argyi* H.Lév. & Vaniot, **feddei* H.Lév. & Vaniot, **iwayomogi* Kitam., **japonica* Thunb., *montana* Schlecht. ex Ledeb., *princeps* Pamp., **rubripes* Nakai, **stolonifera* (Maxim.) V.L.Komarov, *vulgaris* L.). In addition, in the original description were listed *Arctium lappa* L. and *Petasites japonicus* (Sieb. & Zucc.) Maxim. which evidently are not true hosts of this species.

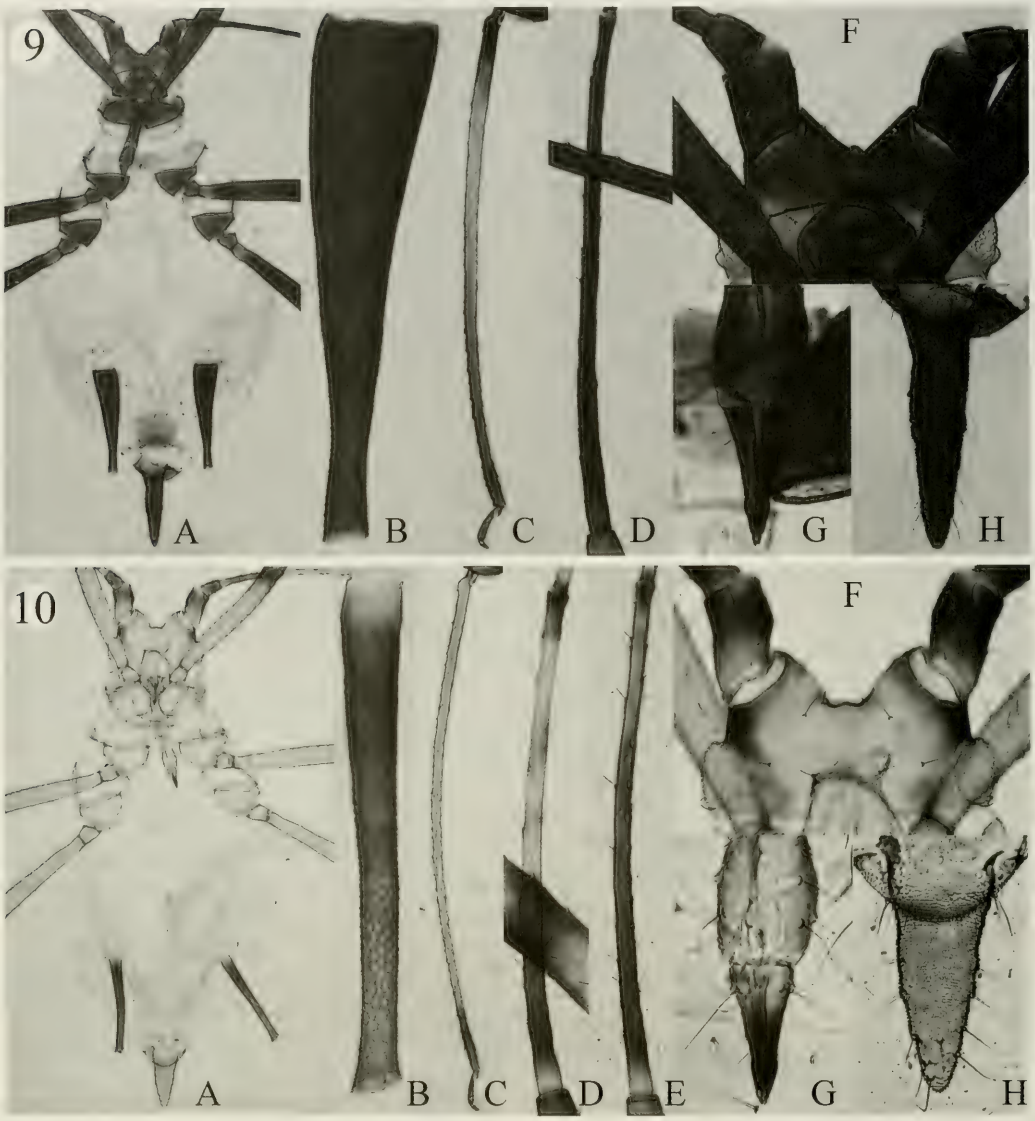
Macrosiphoniella (*Phalangomyzus*) *oblonga* (Mordvilko 1901)
(Fig. 11)

Siphonophora oblonga Mordvilko 1901: 343.

Macrosiphoniella (*Phalangomyzus*) *oblonga hidaensis* Takahashi and Moritsu 1963: 7 (syn. by Miyazaki 1971)

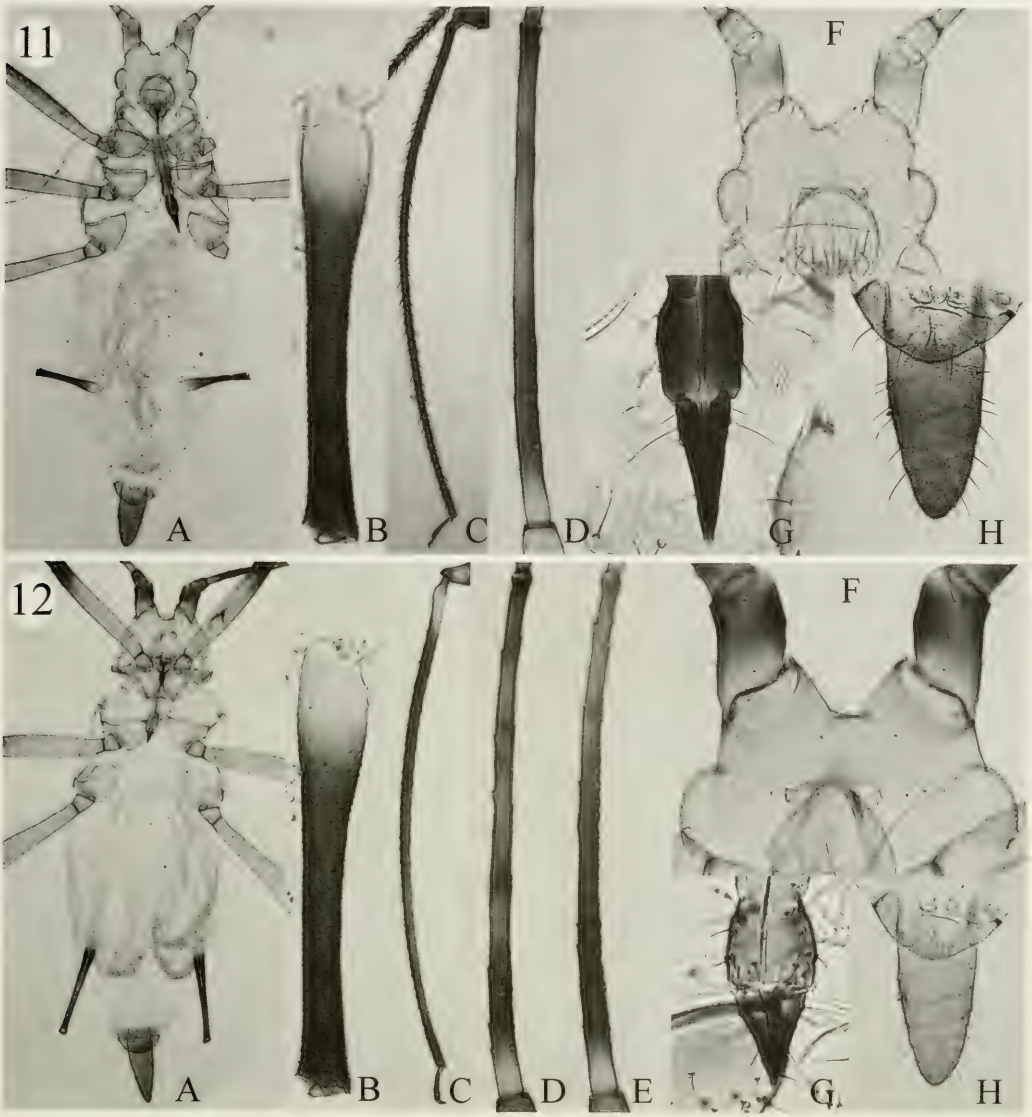
Macrosiphoniella (*Phalangomyzus*) *oblonga*: Szelegiewicz 1980: 471.

Specimens examined.—NORTH KOREA: Botanical Garden, Wonsan, GG, 12.vi.87, on *Artemisia japonica* (87Ha1778,



Figs. 9–10. Apterous viviparous female (unless otherwise indicated). 9 (top), *M.* (*Phalangomyzus*) *gmelinicola.* 10 (bottom), *Macrosiphoniella* (*Ph.*) *grandicauda.* A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Antennal segment III of alate viviparous female. F, Head and antennal segment I–II. G, Ultimate rostral segment. H, Cauda.

87Ha1779, 87Ha1780: apt. & al.); Hyesan, RG, 26.vi.1988, on *Artemisia gigamea* (88Ha3212: apt.). SOUTH KOREA: Naemyon, Hongcheon, GW, 15.x.1997, on unknown *Artemisia* sp. (apt.); Ulsan, GN, 27.v.1998, on *Artemisia princeps* (apt.); Mt. Myongji-san, Gapyong, GG, 25.vii.1999, on unknown *Artemisia* sp. (990725–2SH: apt.); Banjeon-ri, Ingyemyon, Jeongseon, GW, 12.viii.1999, on *A. princeps* (990811-GS16: apt.); Bongpyong-myon, Pyongchang-gun, GW, 3.vi.1999, on *Artemisia argyi* & *Artemisia montana* (99Ho579A, 99Ho580B: al.); Mountain Vegetable Experimental Station, Bongpyong-myon, Pyongchang-gun, GW, 31.v.2001, on *Artemisia* sp. & *Artemisia argyi* (01Ho162A, 01Ho164A, 01Ho175: apt. & al.); National



Figs. 11–12. Apterous viviparous female (unless otherwise indicated). 11 (top), *Macrosiphoniella* (*Phalangomyzus*) *oblonga*. 12 (bottom), *M.* (*Ph.*) *similioblonga*. A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Antennal segment III of alate viviparous female. F, Head and antennal segment I–II. G, Ultimate rostral segment. H, Cauda.

Alpine Agriculture Station, Hyeonggye, Pyongchang, GW, 1.vi.2001, on *Artemisia princeps* (01Ho217: al.). Deposited in SNU, NIAST, and IE CAS

Distribution.—Korea (North, South), Japan (Hokkaido, Honshu, Kyushu, Amaioshima), Russia (Far East, Siberia), western Palaearctic.

Host plants.—*Chrysanthemum frutescens* L., *Artemisia* spp. (*abrotanum* L., *absinthium* L., *annua* L., **argyi* Lev. et Van. , *baldshuanica* Krasch. & Zopr., *campestris* L., *chamaemelifolia* Vill., **gigamea* Kitam., *gmelini* Webb. Ex Stechm., *japonica* Thunb., *macrocephala* Jacquem. ex Bess., *montana* (Nakai) Pamp., *princeps* Pamp., *rubripes* Pamp., *selengensis* Turcz. ex Bess., *siversiana* Ehrh. ex Willd., *stelleri-*

ana Bess., *tournefortiana* Rchb., *verlotiorum* Lamotte, *vulgaris* L.), *Balsamita major* Desf., *Dendranthema* (*indicum* Des Moul., *morifolium* (Ramat.) Tzvelev), *Matricaria perforata* Merat, *Tanacetum parthenium* Sch.Bip.

Note.—Paik (1972) recorded this species for the first time in South Korea. This is a new record for the northern part of the Korean Peninsula.

Macrosiphoniella (*Phalangomyzus*) *pallidipes* Holman, Lee, and Havelka, new species

(Figs. 13–14, Table 2)

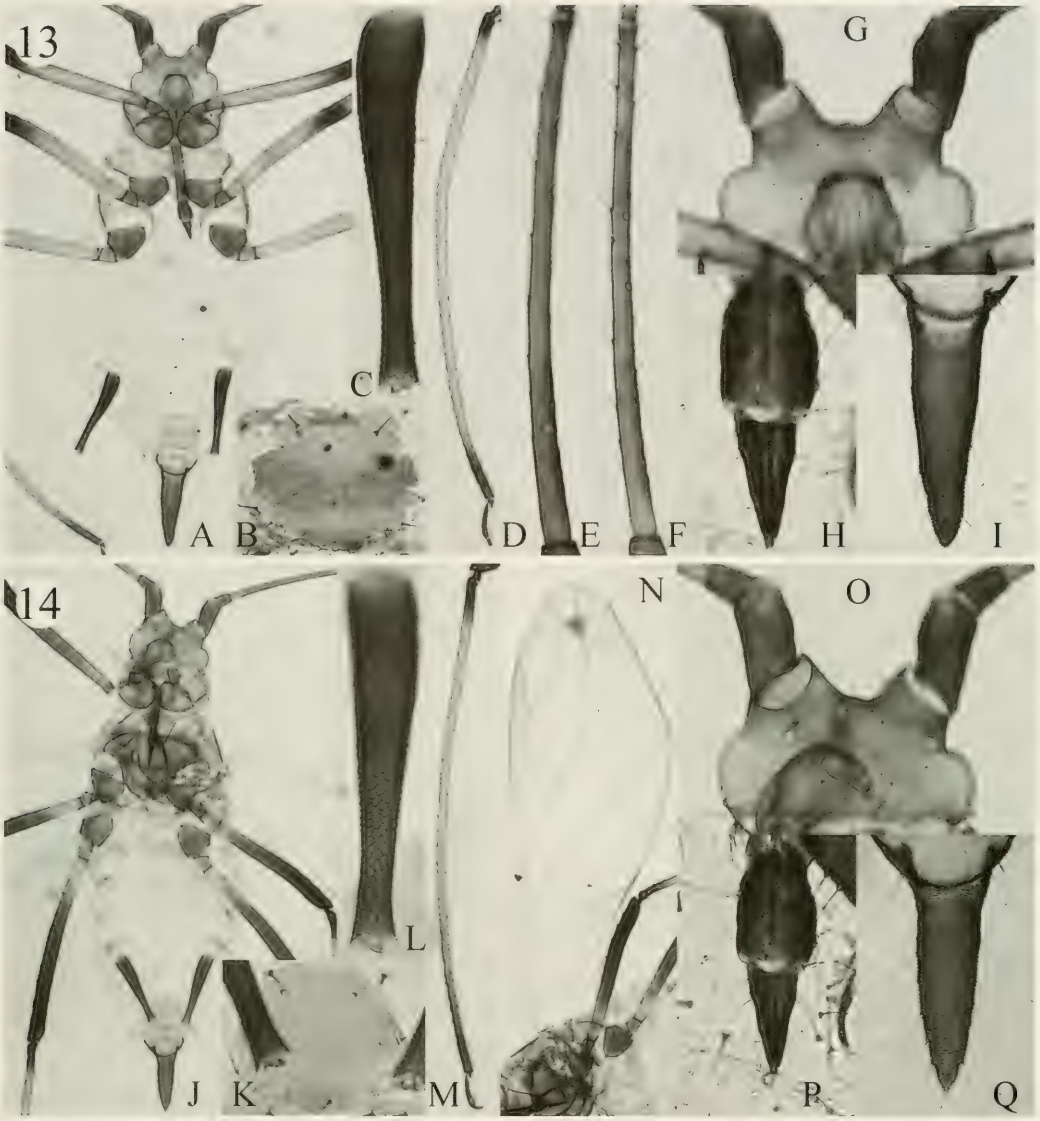
Apterous viviparous female.—*Color:* Green in life with black antenna, knees, tips of legs, siphunculus, and cauda. Cleared specimens brown on anterior part of head and dorsal abdominal sclerites, dark brown on coxae. Antenna black, sometimes with Ant.III pale at base. Legs dark brown to black on coxae, distal ⅓–½ of femora, base and apical part of tibiae, and tarsi; most of femora and most of tibiae pale, trochanters pale to dusky, paler than coxae; siphunculus and cauda black.

Morphological characters: Head spindle-shaped. Head smooth with deeply sinuate frons; cephalic hairs obtuse or slightly pointed, up to 0.08 mm long, 1.50–1.80 × BDAnt.III; antennal tubercles diverging, with 2–3 hairs on inner side; clypeus with 4–5 hairs, mandibular laminae with 4–6 hairs. Antenna longer than body, with Ant.I and Ant.VIb 0.44–0.51 × and 0.33–0.37 × HW, respectively; antennal hairs obtuse or slightly capitate, longest hairs on Ant.III subequal to BDAnt.III. Secondary rhinaria of unequal sizes, moderately protruding with narrow rims; 4–14 in number, irregularly scattered on basal half of Ant.III; primary rhinaria ciliate. Rostrum extending beyond middle coxae; URS wedge-shaped with 8 accessory hairs. Legs long; hairs on femora shorter than or subequal to BDAnt.III; dorsal hairs on middle part of hind tibia equal to, or slightly longer than diameter of tibia at midpoint; hind tarsus with 10–12 hairs apart from 3 apical pairs. Abdominal dorsum membranous with large antesiphuncular sclerites, scleroites at base of spinal hairs on tergum 7 and a diffuse transverse bar on tergum 8 which is sometimes broken in separate scleroites. Dorsal abdominal hairs abruptly pointed, 1.10–1.70 × as long as BDAnt.III, 10–12 on tergum 3, 4 on tergum 6 between siphunculi and 5–6 on tergum 8. Siphunculus elongate bottle-shaped, reticulate on distal half or more. Cauda not constricted, with 12–18 hairs. Genital plate with 2 long hairs on anterior half and 6–11 short ones along hind margin. See Table 2 for measurements.

Alate viviparous female.—*Color:* Thorax dark brown to black, femora pale on basal ⅕ only, otherwise not differing from apterae. *Morphological characters:* Similar to apterous female except following: antenna with 15–25 secondary rhinaria covering ⅗–⅘ of Ant.III; siphunculus thinner and relatively shorter than those in apterae, 0.13–0.15 × body length; abdominal dorsum with marginal sclerites on segments 2–4, antesiphuncular sclerites and a bar on segment 8.

Type material.—Holotype (apterous viviparous female Coll.# 00Ho62/apt.1): Daebudo, GG, South Korea, 18.x.2000, leg. Jaroslav Holman, on *Artemisia scoparia.* Paratypes. 8 apterous viviparous females (Coll.# 001018-SH14), same data as for the holotype, leg. Seunghwan Lee; 14 apterous viviparous females and 1 alate viviparous female (Coll.# 88Ha2699, 88Ha2700, 88Ha2701), Taesong-san Botanical Garden, Pyongyang-si Dist., 30.v.1988, on *Artemisia annua,* leg. Jan Havelka; 6 apterous females and 1 alate viviparous female from the same locality (Coll.# 88Ha2865a), 6.vi.1988, on *Artemisia annua,* leg. Jan Havelka. Holotype deposited in CALS SNU, and paratypes in CALS SNU, NIAST, and IE CAS

Host plants and biology.—**Artemisia annua* & *A. scoparia,* one sample was collected on stem and the leaves of **A. iwayomogi* cultivated in the vicinity of *A. annua*



Figs. 13–14. *Macrosiphoniella* (*Phalangomyzus*) *pallidipes*. 13 (top), Apterous viviparous female. 14 (bottom), Alate viviparous female. A, Entire body. B, Genital plate. C, Siphunculus. D, Hind tibia and tarsus. E, Antennal segment III. F, Antennal segment III of alate viviparous female. G, Head and antennal segment I-II. H, Ultimate rostral segment. I, Cauda. J, Whole body. K, Siphunculus. L, Hind tibia and tarsus. M, Forewing. N, Head and antennal segment I-II. O, Ultimate rostral segment. P, Cauda.

L. Presumably monoecious and holocyclical as are most *Macrosiphoniella* species.

Distribution.—Korea (North, South).

Etymology.—The species name, Latin "*pallidipes*" (= having pale legs) refers to reduced pigmentation of legs.

Systematic position.—*Macrosiphoniella* (*Ph.*) *pallidipes* resembles *M.* (*Ph.*) *antennata* by its black cauda, black siphunculi, and by most of its metric characteristics. It differs from the latter (data in parenthesis) by being green in life (bluish or pinkish, pruinose, with a dark spot between the siphunculi), having pale tibiae with a dark base and apex (uniformly dark, sometimes brownish in the middle but not pale), and

by relatively short antennae, legs, and siphunculi. For measurements and comparison of the two species, particularly ratios Ant./BL, SIPH/BL, SIPH/HW and HFEM/HW, see Table 2.

Macrosiphoniella (*Phalangomyzus*) *similioblonga* Zhang 1980 *in* Zhang and Zhong 1980
(Fig. 12)

Macrosiphoniella similioblonga Zhang *in* Zhang and Zhong 1980:215.
Macrosiphoniella (*Phalangomyzus*) *similioblonga*: Remaudière and Remaudière 1997.

Specimens examined.—NORTH KOREA: Botanical Garden, Wonsan, GW, 12.vi.1987, on *Artemisia japonica* (87Ha1760, 87Ha1774, 87Ha1775, 87Ha1781, 87Ha1783b, 87Ha1817: apt. & al.). SOUTH KOREA: National Arboretum, Kwangreung, Pocheon, GG, 21.v.1999, on *Artemisia selengensis* (990521-GS29: apt. & al.). Deposited in CALS SNU, NIAST, and IE CAS.

Distribution.—Korea (North, South), China (Beijing).

Host plants.—*Artemisia* spp. (*japonica* Thunb., *selengensis* Turcz ex Bess., *vulgaris* L.).

Macrosiphoniella (*Phalangomyzus*) sp.
(Fig. 15, Table 2)

Macrosiphoniella (*Phalangomyzus*) sp. B: Paik 1972: 404.

Alate viviparous female.—*Color:* In life unknown. Cleared specimens dark brown to blackish on head, thorax, siphunculus, and cauda. Sclerotized areas on abdominal dorsum pale brown or brown. Ant.I—III concolorous with head, becoming distally paler. Legs blackish with pale coxae, trochanters, base of femora, and middle third of tibiae. Wings hyaline.

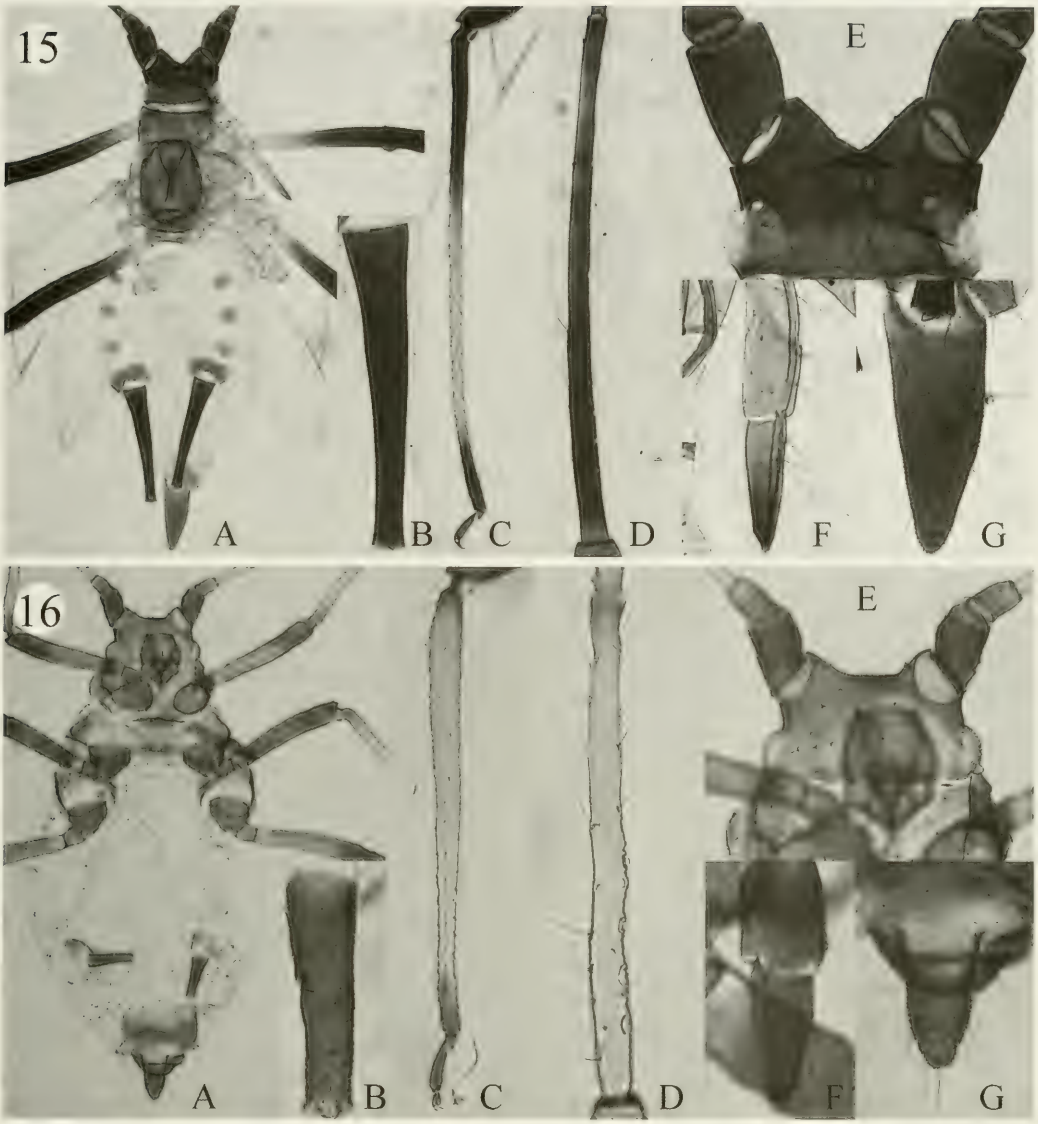
Morphological characters: Body elongate oval, 3 mm long or longer. Head with deeply sinuate frons; antennal tubercles high, with 2–3 hairs on inner side. Dorsal cephalic hairs acuminate, up to 0.06 mm long, equal to, or slightly longer than BDAnt.III. Antenna about 1.5 × as long as body. Antennal hairs obtuse to slightly clavate, up to 0.70 of BDAnt.III. Primary rhinaria naked. Secondary rhinaria moderately convex with wide rims, about 30 on entire length of Ant.III. Rostrum attaining hind coxae. URS wedge-shaped, about 0.20 mm long, distinctly longer than HT2, with 8 accessory hairs which are up to twice as long as longest (lateral) apical ones. Legs very long, and hind tibia about 0.85 of BL. First tarsal segments with 3,3,3 hairs, HT2 with 2 dorso lateral and 7 ventral hairs in addition to 6 apical ones. Abdominal dorsum membranous, with marginal sclerites on segments 2–4 and large antesiphuncular sclerites. Siphunculus about 1/5 of BL or longer, at least 1.50 × as long as cauda, nearly smooth on basal half and reticulate on apical 0.40–0.45; flange not developed. Cauda tongue-shaped, without constriction, bearing 8–10 hairs. Genital plate with 4–5 hairs on anterior half and 15–18 hairs along hind margin. See Table 2 for measurements.

Host plant and biology.—Unknown, presumably holocyclic, monoecious, presumably living on stems of a robust Asteraceae: Anthemideae (*Artemisia*?) covered with long, dense hairs.

Specimens examined.—3 alate viviparous females trapped in a yellow water pan at Danyang, CB, South Korea, 11–20.viii.1969, leg. Woonhah Paik, from Paik's collection deposited in NIAST. This corresponds to the collection data given by Paik (1972) for his *Macrosiphoniella* sp.B. Paik (1972) seems to have dealt with only one specimen provided with a manuscript name, "paczoskioides" given it by Hille Ris Lambers (1998). However, all three specimens trapped in the same yellow water pan trap at the same time evidently are conspecific.

Distribution.—Korea (South).

Systematic position.—By size and shape of the body, long appendages, shape, and pigmentation of the siphunculi and cauda,



Figs. 15–16. 15 (top), Alate viviparous female of *Macrosiphoniella* (*Phalangomyzus*) sp. (= Paik's (1972)'s *Macrosiphoniella* sp. B). 16 (bottom), Apterous viviparous female of *Macrosiphoniella* (*Sinosiphoniella*) *chaetosiphon*. A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Head and antennal segment I–II. F, Ultimate rostral segment. G, Cauda.

as well as by having 8 accessory hairs on the URS, the specimens studied belong to subgen. *Phalangomyzus* and are related to *M.* (*Ph.*) *antennata* and *M.* (*Ph.*) *pallidipes*. They differ from both species in having naked primary rhinaria, and from *M.* (*Ph.*) *antennata* also by pale coxae, trochanters, and middle part of the tibiae. Moreover, the specimens studied differ from the two species mentioned and all other known species of the subgenus in having unusually long URS. Thus, they represent a separate, well defined and hitherto unknown species. In spite of this, we refrain from naming the species in view of the limited number of specimens, absence of data on the apterous viviparous female, and its unknown biology.

Subgenus *Sinosiphoniella* Tao 1963

Sinosiphoniella Tao 1963: 200. Type species: *Macrosiphoniella kuwayamai* Takahashi 1941, by monotypy.

Macrosiphoniella (*Sinosiphoniella*) *chaetosiphon* Takahashi and Moritsu 1963 (Fig. 16)

Macrosiphoniella chaetosiphon Takahashi and Moritsu 1963: 6.

Macrosiphoniella (*Sinosiphoniella*) *chaetosiphon*: Remaudière and Remaudière 1997: 113.

Specimens examined.—SOUTH KOREA: Kwagreung National Arboretum, Pocheon, GG, 19.x.2000, on *Artemisia princeps* (001018-TM23: oviparous females). Deposited in NIAST and SNU.

Distribution.—Korea (central), Japan (Honshu).

Host plants.—*Artemisia* (*princeps. capillaris*),? *Chrysanthemum.*

Note.—This species seems to be very rare. Two oviparous females were collected in one sample together with *Macrosiphoniella* (*Sinosiphoniella*) *hikosanensis.* Paik (1972) reported this species on *Artemisia capillaris* from South Korea, and this is the second record from the Korean Peninsula.

Macrosiphoniella (*Sinosiphoniella*) *hikosanensis* Moritsu 1949 (Fig. 17)

Macrosiphoniella hikosanensis Moritsu 1949: 55.

Macrosiphoniella (*Sinosiphoniella*) *hikosanensis*: Szelegiewicz 1980: 471.

Specimens examined.—NORTH KOREA: Onjong-ri, Kumkang Mts., GW, 23.v.1988, on *A. stolonifera* (88Ha2536: apt.). [South Korea] Kwangnung National Arboretum, Pocheon, GG, 19.x.2000, *Artemisia princeps* (001018-TM23, 00Ho95: all oviparae). Deposited in SNU, NIAST, and IE CAS.

Distribution.—Korea (North, South), Japan (Hokkaido, Honshu, Kyushu), India, Russia (Far East)

Host plants.—*Artemisia* spp. (*montana, princeps, rubripes, stolonifera, vulgaris*).

Notes.—This species was first reported from South Korea by Paik (1965). This is the first record from North Korea. One apterous female was collected within the colony of *M.* (*Sinosiphoniella*) *kuwayamai,* and four apterous oviparous females were collected in one sample together with *Macrosiphoniella* (*Sinosiphoniella*) *chaetosiphon.*

Macrosiphoniella (*Sinosiphoniella*) *kuwayamai* Takahashi 1941 (Fig. 18)

Macrosiphoniella kuwayamai Takahashi 1941: 8.

Sinosiphoniella kuwayamai: Tao 1963: 200; Paik 1965: 85.

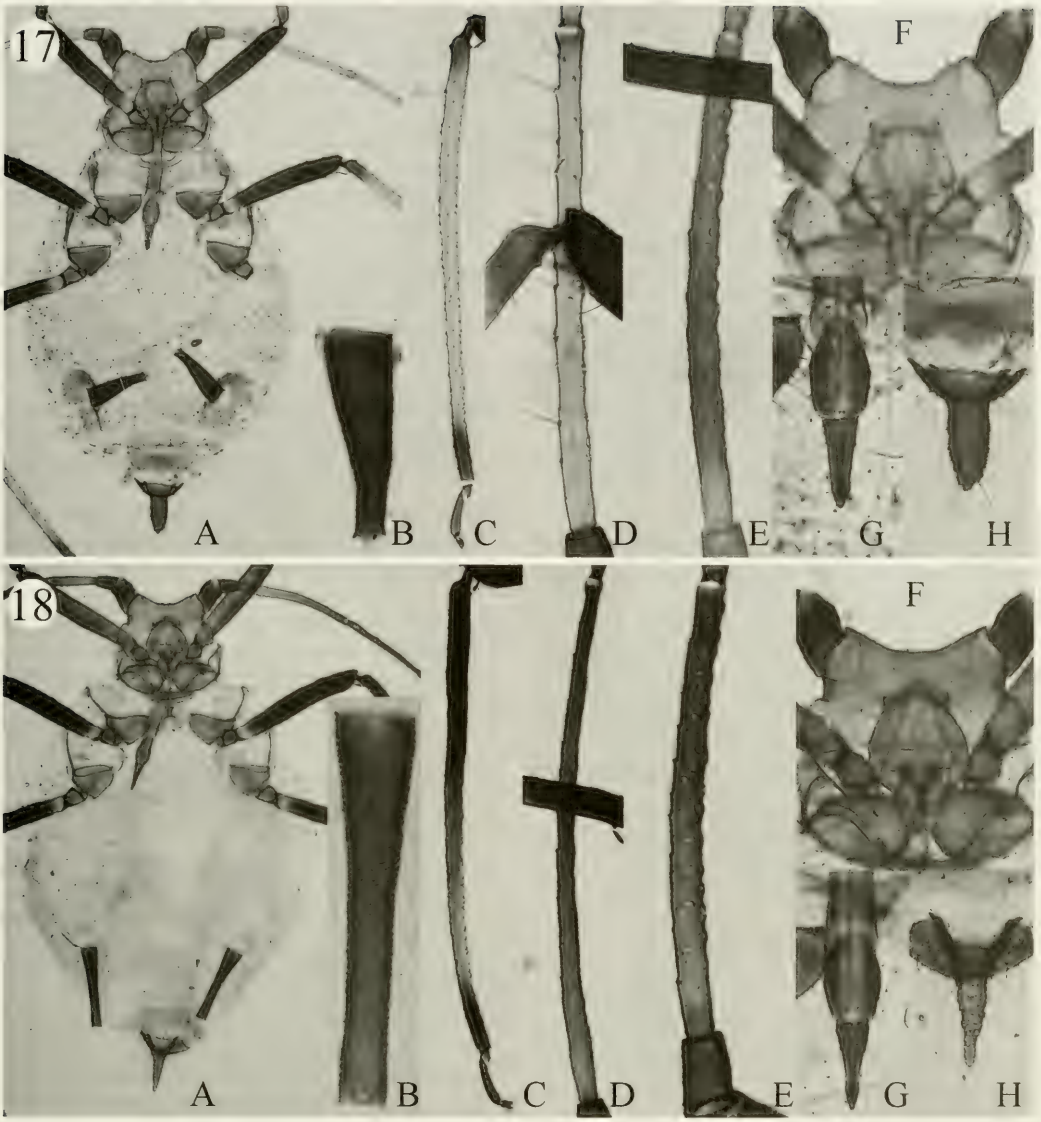
Macrosiphoniella (*Sinosiphoniella*) *kuwayamai*: Szelegiewicz 1980: 455.

Specimens examined.—37 samples containing apterous and alate viviparous females collected throughout the Korean Peninsula from the southernmost point of Jeju Island to the Paektu-san Mountain region in the north, on *Artenisia* spp. (*annua, feddei, japonica, lavandulaefolia* DC., *mongolica, stolonifera, stenophylla*). Deposited in CALS SNU, NIAST, and IE CAS.

Distribution.—Korea (South, North), China (Liaoning = Manchuria); Japan (Honshu, Shikoku, Kyushu), Russia (Far East).

Host plants and biology.–*Artemisia* spp. (*argyi, *annua, asiatica* (Pamp.) Nakai ex Kitam., *feddei* H.Lév. & Vaniot, *japonica, keiskeana* Miq., * *lavandulaefolia, mongolica, montana, princeps, rubripes, saitoana, selengensis, sieversiana, stelleriana, *stenophylla, stolonifera, subulata* Nakai, *sylvatica, umbrosa* Turcz. ex DC., *vulgaris*). In early season, the colonies usually are at the base or on the middle part of the host plants, in earthen shelters built by the ants.

Notes.—In North Korean specimens, the siphunculi and cauda vary considerably in relative length. The antennal segment III is



Figs. 17–18. Apterous viviparous female (unless otherwise indicated). 17 (top), *Macrosiphoniella* (*Sinosiphoniella*) *hikosanensis*. 18 (bottom), *M.* (*S.*) *kuwayamai*. A, Entire body. B, Siphunculus. C, Hind tibia and tarsus. D, Antennal segment III. E, Antennal segment III of alate viviparous female. F, Head and antennal segment I–II. G, Ultimate rostral segment. H, Cauda.

also variable in color, from pale to black with usually less than 20 secondary rhinaria, confined to the basal half, but some specimens have up to 30 secondary rhinaria, distributed throughout the segment. The tibia is usually black or dark brown, but in some specimens pale except for the very base and tip.

Correction of Previous Record

Macrosiphoniella (*Sinosiphoniella*) *yomogicola* (Matsumura 1917)

Macrosiphum yomogicola Matsumura 1917: 401.

Macrosiphoniella fulvicola Shinji 1933: 214.

Macrosiphum parvum Shinji 1922: 788.
Macrosiphoniella yomogicola: Paik 1965: 88.
Macrosiphoniella (*Sinosiphoniella*) *yomogicola*: Szelegiewicz 1980: 471.

Specimens examined.—None.

Host plants.—*Artemisia* (*indica, montana, princeps, schmidtiana*), *Chrysanthemum morifolium.* Paik (1965) listed *Ixeris dentata* which seems to not be the true host. This species is frequently visited by ants under earthen shelters (Miyazaki 1971).

Distribution.—Korea (South), Japan (Hokkaido, Honshu, Shikoku), China (Fujan, Sichuan).

Notes.—Recorded by Paik (1965) from South Korea but omitted in subsequent publications (Paik et al. 1969, Paik 1972). As neither the illustrations (Paik 1965: 87) nor most host plants reported by Paik (1965) correspond to the present species, we suppose that this record from South Korea resulted from a misidentification. As no other collections from the Korean Peninsula exist, *M. yomogicola* should be deleted from the list of Korean aphids.

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